

**ABSTRACT**

The invention provides novel genetic constructions for the expression of inhibitory RNA in the cytoplasm of eukaryotic cells. The inhibitory RNA may be an anti-sense RNA or a co-suppressor RNA, and functions to reduce the expression of a gene of interest in the target cell. The genetic constructions of the invention are capable of replicating in the cytoplasm of a eukaryotic cell and comprise a promoter region in functional combination with an encoding polynucleotide. The genetic constructions may be designed so as to replicate in the cytoplasm of plant cells, yeast cells, and mammalian cells. When the eukaryotic cell of interest is a plant cell, the genetic construction is preferably derived from a plant RNA virus. Plant RNA virus derived genetic constructions may employ a plant virus subgenomic promoter, including subgenomic promoters from tobamoviruses in functional combination with the RNA encoding region. In a preferred embodiment of the invention, plant cells are induced to produce elevated levels of the carotenoid phytoene. The elevated levels of phytoene are achieved by inhibiting the expression of the enzyme phytoene desaturase using the vectors of the invention.